

WHAT IS CLAIMED IS:

1. A control system for a Light Emitting Diode (LED) based light system, comprising:
a plurality of feedback units for generating feedback signals representative of luminance
5 and chrominance characteristics; and

a controller in signal communication with said plurality of feedback units configured to
provide drive signals to light source assemblies during respective non-overlapping intervals
and to adjust said drive signals in response to feedback signals from said plurality of
feedback units.

2. The system of claim 1, wherein a feedback unit of said feedback units further comprises:
a sensor for sensing luminance and chrominance characteristics during one of said non-
overlapping intervals, wherein said non-overlapping interval is associated with said sensor
and with one of said light source assemblies.

3. The system of claim 1, wherein a feedback unit of said feedback units further comprises:
a sample-and-hold module for sampling feedback signals from a sensor during a non-
overlapping interval of said non-overlapping intervals and holding feedback signals during
other non-overlapping intervals, wherein said non-overlapping interval is associated with said
20 sample-and-hold module.

4. The system of claim 1, wherein a light source assembly of said light source assemblies
comprises:

a light source, which includes a red LED, a green LED, and a blue LED; and
25 a driver configured to provide color-specific drive signals to said red LED, said green
LED, and said blue LED.

5. The system of claim 1, wherein:

said controller acquires differences between said feedback signals and a reference
30 value and adjusts said drive signals on a per-color basis to compensate for said differences.

6. The system of claim 5, further comprising:

a reference value generator for converting a reference input to CIE 1931 tristimulus reference values; and

a feedback signal translator for converting a feedback signal of said feedback signals to
5 CIE 1931 tristimulus measured values, wherein

said controller acquires differences between said feedback signals and a reference value by determining a difference between said CIE 1931 tristimulus reference values and said CIE 1931 tristimulus measured values for each of said feedback signals.

10 7. The system of claim 5, further comprising:

a reference value generator for:

converting a reference input to CIE 1931 tristimulus reference values; and

translating said CIE 1931 tristimulus reference values to tristimulus reference values
in RGB space, wherein

15 said controller acquires differences between said feedback signals and a reference value by determining a difference between said tristimulus reference values in RGB space and said feedback signals.

8. The system of claim 1, further comprising:

20 a light guide panel for directing light from said light source assemblies to said feedback units, wherein said feedback units provide feedback related to luminance and chrominance characteristics within said light guide panel related to light source assemblies with which said feedback units are associated.

25 9. The system of claim 1, wherein:

said controller provides said drive signals for a signal duration no longer than said non-overlapping interval; and

said controller adjusts said drive signals on a per-color basis by changing said signal
duration from a first duration to a second duration, wherein said second duration is no longer
30 than said non-overlapping interval.

10. A method for controlling a Light Emitting Diode (LED) light system, comprising:
providing drive signals to light sources during respective non-overlapping intervals;
receiving light source-specific feedback signals in response to said providing drive
signals to light sources during respective non-overlapping intervals; and
5 adjusting said drive signals in response to the light source-specific feedback signals.

11. The method of claim 10, wherein said providing includes:
providing said drive signals in repeating sequential non-overlapping intervals.

10 12. The method of claim 10, wherein said adjusting includes:
acquiring differences between said light source-specific feedback signals and a reference
value; and
adjusting said drive signals on a per-color basis to compensate for said differences.

15 13. The method of claim 10, further comprising:
receiving a reference input;
converting said reference input to said reference value;
comparing said reference value to said light source-specific feedback signals.

20 14. The method of claim 10, further comprising:
receiving a reference input;
converting said reference input to said reference value, wherein said reference value
includes CIE 1931 tristimulus values;
converting said light source-specific feedback signals to CIE 1931 tristimulus values; and
25 comparing said reference value to said light source-specific feedback signals.

15. The method of claim 10, further comprising:
generating said light source-specific feedback signals according to luminance and
chrominance characteristics of light from said light sources.

16. A Light Emitting Diode (LED) based light system, comprising:

a plurality of light source assemblies;

a plurality of feedback units, each of the feedback units being in optical communication with at least one of the light source assemblies; and

5 a controller in signal communication with the light source assemblies and the feedback units and configured to:

provide drive signals to the light source assemblies at non-overlapping intervals;

receive light source-specific feedback signals from the feedback units in response to the drive signals that are provided at non-overlapping intervals; and

10 adjust the drive signals provided to the light source assemblies in response to the light source-specific feedback signals.

17. The LED-based light system of claim 16 wherein the feedback units include color sensors for detecting luminance and chrominance characteristics of light.

15 18. The LED-based light system of claim 16 wherein the feedback units include color sensors for generating light source-specific feedback signals.

19. The LED-based light system of claim 18 wherein the controller is configured to provide 20 color-specific and light source-specific drive signals to the light sources in response to the light source-specific feedback signals.

20. The LED-based light system of claim 16 wherein:

the light source assemblies include red, green, and blue light emitting diodes (LEDs);

25 the feedback units include color sensors for generating light source-specific feedback signals; and

the controller is configured to provide color-specific and light source-specific drive signals to the light source assemblies in response to the light source-specific feedback signals.